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Reply to Office action of January 29, 2007

Claim Amendments

This listing of the claims will replace all prior versions,  
and listings, of claims in the application:

Claim 1 (currently amended): An apparatus for producing  
secondary electrons, comprising:

at least one primary electrode for producing primary  
electrons;

an acceleration electrode for accelerating the primary  
electrons; and

a secondary electrode for producing secondary electrons when  
the accelerated primary electrons arrive, said secondary  
electrode having at least one aperture opening formed therein.

Claim 2 (currently amended): The apparatus according to claim  
1, wherein:

~~said secondary electrode is formed with at least one aperture  
opening,~~

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said aperture opening extends obliquely through said secondary electrode and/or said aperture opening prevents primary electrons from passing through.

Claim 3 (original): The apparatus according to claim 2, wherein said aperture opening is formed by an elongated hole defined by side surfaces configured parallel to one another.

Claim 4 (original): The apparatus according to claim 2, wherein:

said aperture opening is defined by side surfaces that overlap in a direction at which the primary electrons arrive into said aperture opening.

Claim 5 (currently amended): The apparatus according to claim [[2]] 3, wherein:

said secondary electrode has a surface in which said aperture opening is formed;

said surface has a normal; and

said side surfaces of said aperture opening are configured aligned with said normal.

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Claim 6 (original): The apparatus according to claim 2,  
wherein said aperture opening is formed by laminates.

Claim 7 (currently amended): The apparatus according to claim  
1, wherein:

said ~~secondary electrode is formed with~~ at least one aperture  
opening ~~having~~ has an aperture direction configured at an  
angle of a magnitude of between 30° and 70° with respect to a  
normal of said secondary electrode near said aperture opening.

Claim 8 (original): The apparatus according to claim 7,  
wherein:

said angle has a magnitude of 55° with respect to the normal  
of said secondary electrode near said aperture opening.

Claim 9 (currently amended): The apparatus according to claim  
1, wherein:

said ~~secondary electrode is formed with~~ at least one aperture  
opening ~~having~~ has an aperture direction configured at an  
angle defined by:  $\tan (90^\circ - w) = d/b$ ; and

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w is said angle, d is a thickness of said secondary electrode,  
and b is a width of said aperture opening.

Claim 10 (currently amended): The apparatus according to  
claim 1, wherein:

said secondary electrode has side walls defining ~~[[an]]~~ said  
aperture opening;

said side walls are spaced a distance apart; and

said distance between said side walls is between 2 mm and 6  
mm.

Claim 11 (original): The apparatus according to claim 10,  
wherein said distance between said side walls is 4 mm.

Claim 12 (original): The apparatus according to claim 1,  
wherein:

said at least one primary electrode includes only one primary  
electrode.

Claim 13 (original): The apparatus according to claim 1,  
further comprising:

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a plurality of primary electrodes;

said secondary electrode formed with a plurality of aperture openings;

each one of said plurality of primary electrodes associated with a respective one of said plurality of aperture openings; and

at least one of said plurality of aperture openings being at a different inclination angle than another one of said plurality of aperture openings.

Claim 14 (currently amended): The apparatus according to claim 1, wherein:

~~said secondary electrode is formed with at least one aperture opening;~~

said secondary electrode is made of aluminum or of an aluminum alloy.

Claim 15 (original): The apparatus according to claim 1, wherein:

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said secondary electrode is made of Al 99 or of an even purer aluminum.

Claim 16 (currently amended): The apparatus according to claim 1, wherein:

~~said secondary electrode is formed with at least one aperture opening, and~~

said secondary electrode is made of graphite or contains at least 60% by mass of graphite.

Claim 17 (currently amended): The apparatus according to claim 1, wherein:

~~said secondary electrode is formed with at least one aperture opening, and~~

said secondary electrode is made of aluminum oxide.

Claim 18 (currently amended): The apparatus according to claim 1, wherein:

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~~said secondary electrode is formed with at least one aperture  
opening, and~~

said secondary electrode has a mean surface roughness of  
between 5 and 8  $\mu\text{m}$ .

Claim 19 (original): The apparatus according to claim 1,  
wherein:

said acceleration electrode is formed with at least 100  
openings.

Claim 20 (original): The apparatus according to claim 1,  
wherein:

said acceleration electrode is formed at least 500 openings.

Claim 21 (original): The apparatus according to claim 1,  
wherein:

said acceleration electrode is formed with at least 1000  
openings.

Claim 22 (original): The apparatus according to claim 19,  
wherein:

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said acceleration electrode includes a wire mesh having at least 100 holes or meshes.

Claim 23 (original): The apparatus according to claim 1, wherein:

said acceleration electrode is formed with at least 100 openings; and

said acceleration electrode is made of aluminum or an aluminum alloy.

Claim 24 (original): The apparatus according to claim 1, wherein:

said acceleration electrode is formed with at least 100 openings; and

said acceleration electrode is made of Al 99.9 or an even purer aluminum.

Claim 25 (original): The apparatus according to claim 1, wherein:



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said acceleration electrode is formed with at least 100 openings; and

said secondary electrode has a mean surface roughness; and

said acceleration electrode has a mean surface roughness of less than said mean surface roughness of said secondary electrode.

Claim 26 (original): The apparatus according to claim 25, wherein:

said mean surface roughness of said acceleration electrode is between 2.5 and 6  $\mu\text{m}$ .

Claim 27 (original): The apparatus according to claim 1, further comprising:

a free space for an ion beam to pass through; and

a workpiece;

said ion beam being directed at said workpiece.

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Claim 28 (original): The apparatus according to claim 27,  
wherein said workpiece is a semiconductor substrate.

Claim 29 (original): The apparatus according to claim 1,  
further comprising:

a free space used for holding a material or workpiece to be  
processed.

Claim 30 (original): The apparatus according to claim 1,  
further comprising:

a free space for an ion beam to pass through;

said primary electrode configured parallel to a propagation  
direction of said ion beam.

Claim 31 (original): The apparatus according to claim 1,  
further comprising:

a free space for an ion beam to pass through;

said primary electrode configured transversely with respect to  
a propagation direction of said ion beam.

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Claim 32 (original): An apparatus for producing secondary electrons, comprising:

at least one primary electrode for producing primary electrons; and

a secondary electrode for accelerating the primary electrons;

said secondary electrode formed with at least one aperture opening for preventing primary electrons from passing through.

Claim 33 (original): The apparatus according to claim 32, wherein:

said aperture opening extends obliquely through said secondary electrode.

Claim 34 (original): The apparatus according to claim 33, wherein said aperture opening is formed by an elongated hole defined by side surfaces configured parallel to one another.

Claim 35 (original): The apparatus according to claim 33, wherein:

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said aperture opening is defined by side surfaces that overlap in a direction at which the primary electrons arrive into said aperture opening.

Claim 36 (currently amended): The apparatus according to claim ~~[[33]]~~ 34, wherein:

said secondary electrode has a surface in which said aperture opening is formed;

said surface has a normal; and

said side surfaces of said aperture opening are configured aligned with said normal.

Claim 37 (original): The apparatus according to claim 33, wherein said aperture opening is formed by laminates.

Claim 38 (original): The apparatus according to claim 32, wherein:

said aperture opening has an aperture direction configured at an angle of a magnitude of between 30° and 70° with respect to a normal of said secondary electrode near said aperture opening.

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Claim 39 (original): The apparatus according to claim 38,  
wherein:

said angle has a magnitude of  $55^\circ$  with respect to the normal  
of said secondary electrode near said aperture opening.

Claim 40 (original): The apparatus according to claim 32,  
wherein:

said opening has an aperture direction configured at an angle  
defined by:  $\tan (90^\circ - w) = d/b$ ; and

w is said angle, d is a thickness of said secondary electrode,  
and b is a width of said aperture opening.

Claim 41 (original): The apparatus according to claim 32,  
wherein:

said secondary electrode has side walls defining said aperture  
opening;

said side walls are spaced a distance apart; and

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said distance between said side walls is between 2 mm and 6 mm.

Claim 42 (currently amended): The apparatus according to claim [[32]] 41, wherein said distance between said side walls is 4 mm.

Claim 43 (original): The apparatus according to claim 32, wherein:

said at least one primary electrode includes only one primary electrode.

Claim 44 (original): The apparatus according to claim 32, further comprising:

a plurality of primary electrodes;

said secondary electrode formed with a plurality of aperture openings;

each one of said plurality of primary electrodes associated with a respective one of said plurality of aperture openings; and

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at least one of said plurality of aperture openings being at a different inclination angle than another one of said plurality of aperture openings.

Claim 45 (original): The apparatus according to claim 32,  
wherein:

said secondary electrode is made of aluminum or of an aluminum alloy.

Claim 46 (original): The apparatus according to claim 32,  
wherein:

said secondary electrode is made of Al 99 or of an even purer aluminum.

Claim 47 (original): The apparatus according to claim 32,  
wherein:

said secondary electrode is made of graphite or contains at least 60% by mass of graphite.

Claim 48 (original): The apparatus according to claim 32,  
wherein:

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said secondary electrode is made of aluminum oxide.

Claim 49 (original): The apparatus according to claim 32,  
wherein:

said secondary electrode has a mean surface roughness of  
between 5 and 8  $\mu\text{m}$ .

Claim 50 (original): The apparatus according to claim 32,  
further comprising:

a free space for an ion beam to pass through; and  
  
a workpiece;

said ion beam being directed at said workpiece.

Claim 51 (original): The apparatus according to claim 50,  
wherein said workpiece is a semiconductor substrate.

Claim 52 (original): The apparatus according to claim 32,  
further comprising:

a free space used for holding a material or workpiece to be  
processed.



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Claim 53 (original): The apparatus according to claim 32,  
further comprising:

a free space for an ion beam to pass through;

said primary electrode configured parallel to a propagation  
direction of said ion beam.

Claim 54 (original): The apparatus according to claim 32,  
further comprising:

a free space for an ion beam to pass through;

said primary electrode configured transversely with respect to  
a propagation direction of said ion beam.

Claim 55-62 (cancelled).